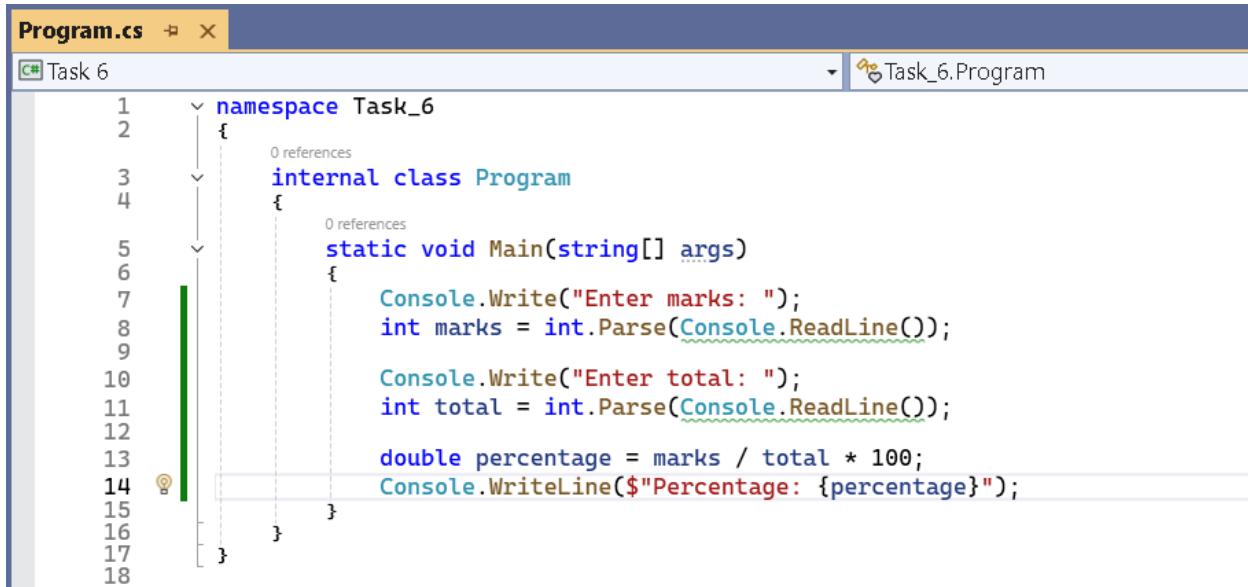


# Task 6 - Debugging

## Overview

This task involves debugging a program that is designed to calculate the percentage based on the marks obtained and the total possible marks.



The screenshot shows the Microsoft Visual Studio IDE interface. The title bar says "Program.cs" and "Task 6". The solution name "Task\_6.Program" is visible in the top right. The code editor displays the following C# code:

```
1  namespace Task_6
2  {
3      internal class Program
4      {
5          static void Main(string[] args)
6          {
7              Console.Write("Enter marks: ");
8              int marks = int.Parse(Console.ReadLine());
9
10             Console.Write("Enter total: ");
11             int total = int.Parse(Console.ReadLine());
12
13             double percentage = marks / total * 100;
14             Console.WriteLine($"Percentage: {percentage}");
15         }
16     }
17 }
18
```

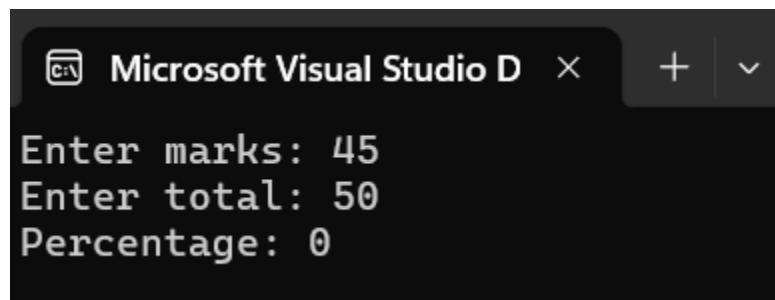
A green vertical bar highlights line 14, which contains the assignment statement "double percentage = marks / total \* 100;". A yellow question mark icon is located at the bottom left of the code editor area.

## Program Purpose

The main function of the program is to take input for the marks scored and the total marks, then compute and display the resulting percentage.

## Observed Issue

When the program is executed and the values 45 (marks) and 50 (total) are entered, the output displayed is 0%. This is incorrect and indicates a problem within the program's logic or calculation method.

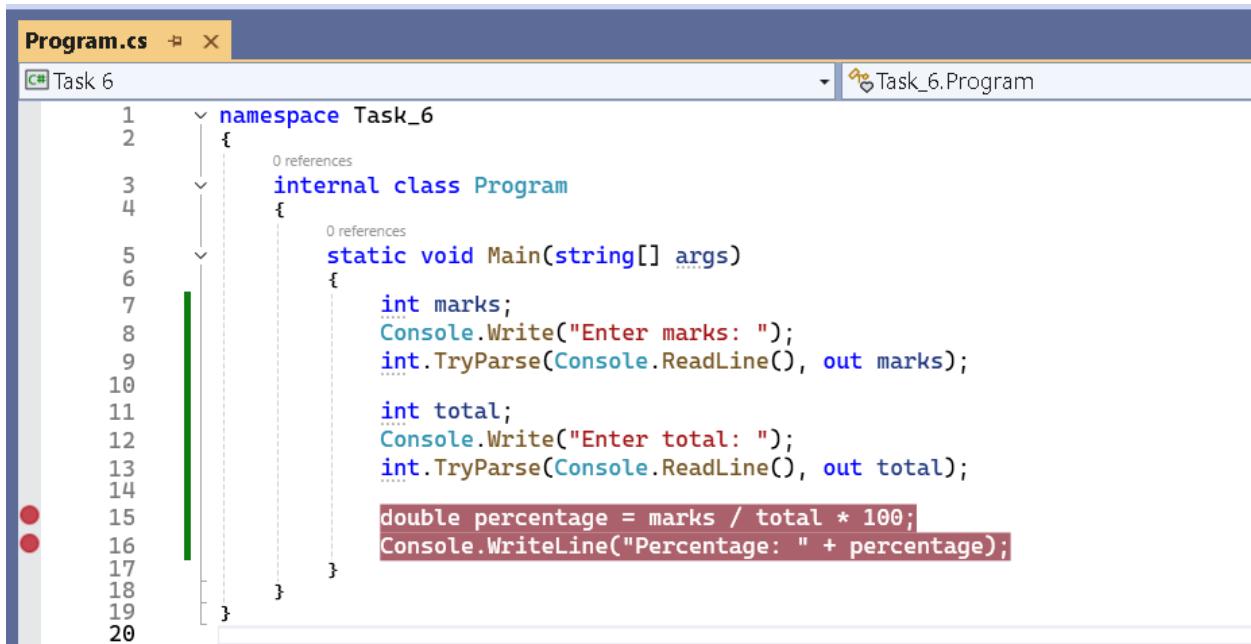


The screenshot shows a terminal window titled "Microsoft Visual Studio D". The output of the program is displayed:

```
Enter marks: 45
Enter total: 50
Percentage: 0
```

## Debugging Approach

To identify the cause of the incorrect output, we introduced breakpoints at two points in the program: before the calculation of the percentage and after the calculation. This breakpoint allows us to observe the state of the program and the values of variables at each step helping us where the logic or calculation may be going wrong.



```
1  namespace Task_6
2  {
3      internal class Program
4      {
5          static void Main(string[] args)
6          {
7              int marks;
8              Console.Write("Enter marks: ");
9              int.TryParse(Console.ReadLine(), out marks);
10
11             int total;
12             Console.Write("Enter total: ");
13             int.TryParse(Console.ReadLine(), out total);
14
15             double percentage = marks / total * 100;
16             Console.WriteLine("Percentage: " + percentage);
17         }
18     }
19 }
20
```

## Reason for Incorrect Output

The program gives an incorrect output because the calculation `marks / total` uses integer division. In integer division any decimal of the result is discarded which leads to wrong percentage value. For example, when calculating 45 divided by 50, integer division results in 0 instead of 0.9. The final displayed percentage is 0% instead of the expected 90%.

## Correcting the Program

To resolve this issue, one of the values in the division should be converted to a double to ensure that floating point division is used. This preserves the decimal portion and gives the correct percentage. The calculation should be modified as follows:

```
double percentage = (double)marks / total * 100;
```